

## ABSTRACT

A programmable molecular device is provided that includes a random nano-network that includes a plurality of molecular circuit components. Preferred molecular circuit components include molecular diodes that exhibit negative differential resistance. A method of programming the molecular device may include configuring the molecular components. Configuring a molecular component may include applying a voltage across input and output leads connected to the nano-network. The voltage may be determined according to a self-adapting algorithm that programs the device to function, for example, as a logic unit or a memory unit. A molecular computer may include a plurality of programmable molecular devices that are interconnected by metallic wires.

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